



# The Quarterly Review

## of Interest Rate Risk

Volume 2, Number 2

Second Quarter, 1997

### EXECUTIVE SUMMARY

#### Interest Rate Sensitivity Falls in the Second Quarter

According to the OTS Net Portfolio Value (NPV) Model, interest rate sensitivity for the thrift industry fell during the second quarter of 1997. At the end of the second quarter, the median sensitivity measure was 187 basis points, a decrease of 16 basis points from the previous quarter. The decline in interest rates during the second quarter accounted for most of the decrease. The industry's ability to absorb interest rate shocks improved in the second quarter, as the median post-shock NPV capital ratio rose to 10.2 percent. Although the overall financial condition of the thrift industry remains strong, a substantial segment of the industry remains vulnerable to potential interest rate shocks. Approximately 42 percent of OTS-regulated thrifts would lose more than 20 percent of their net portfolio value with a 200 basis point rise in interest rates.

### QUARTERLY TREND ANALYSIS

The median sensitivity measure - a key indicator of the industry's interest rate sensitivity - declined to 187 basis points at the end of the second quarter, falling 16 basis points from the end of the first quarter (Chart 1, page 5). A downward shift in the yield curve largely accounts for the decrease in sensitivity between the first and second quarter of 1997. The yield curve at the end of June was lower and flatter than the yield curve at the end of March (Chart 2, page 5). As a result, the effective durations of the industry's assets decreased slightly, while the effective durations of liabilities remained constant (Chart 3, page 6).<sup>1</sup>

The slight decline in median sensitivity returns the industry to the median sensitivity levels of a year ago. The current median sensitivity, however, is still substantially higher than the level of 116 basis points achieved in June 1995.

The median pre-shock NPV ratio for the industry increased to 12.1 percent in June, and the median post-shock NPV ratio increased to 10.2 percent (Chart 4, page 6). Higher post-shock NPV ratios provide thrifts with the ability to better withstand interest rate shocks. Chart 4 also shows that the median post-shock NPV ratio for June 1997 is higher than the corresponding

ratios for June 1996 and June 1995. This improvement is consistent with the growth in industry equity capital ratios over the past two years. Thus, the increase in capital ratios for the industry has more than offset the increase in median sensitivity over this two-year period.

### **ASYMMETRY OF GAINS AND LOSSES**

Table 1 (page 10) reports the percentage change in both the aggregate net portfolio value and NPV capital ratio for the industry under different interest rate scenarios. For the thrift industry, the loss in net portfolio value when interest rates increase is greater than the gain in aggregate net portfolio value when interest rates decrease. For example, in the second quarter of 1997, the thrift industry would lose about 20 percent of its net portfolio value if rates rose by 200 basis points, but would gain only 6.3 percent in value if rates fell by 200 basis points. This asymmetry between gains and losses is largely a result of the embedded call option in mortgage loans and mortgage-backed securities. As interest rates fall, the market value of most mortgages increases, but at a diminishing rate, because declining interest rates make it more likely that mortgages will be prepaid.

As in past quarters, exposure to changes in interest rates was particularly pronounced at some thrifts. The right panel of Chart 5 (page 7) shows the distribution of the percentage change in individual thrift net portfolio values for an increase in interest rates of 200 basis points. Of the 1,171 reporting thrifts, 94 percent would experience a loss of net portfolio value in that scenario. Moreover, about 42 percent of the industry (487

thrifts) would lose more than 20 percent of their economic value if interest rates rose by 200 basis points. The left panel of Chart 5 shows the industry distribution of gains and losses in net portfolio value for a decrease of 200 basis points in interest rates. Under this usually favorable scenario, 76 percent of reporting thrifts would experience increases in their net portfolio values.

Chart 6 (page 7) compares the distributions of gains and losses for the second quarter of 1997 with those for the second quarter of 1996 given both a 200 basis point decrease and increase in interest rates. As shown in the left panel of Chart 6, for a 200 basis point decrease in interest rates, the second quarter 1997 distribution of gains and losses generally has the same number of observations in the upper tail (gains) and the lower tail (losses) as the 1996 distribution. The exception is the percent of thrifts with an NPV gain of 0 to 10 percent. In June 1997, 44.3 percent of thrifts fell in this category compared to 39.2 percent one year ago.

For a 200 basis point increase in interest rates, the 1996 and 1997 distributions of gains and losses are also generally the same, as shown in the right panel of Chart 6. The chart does indicate, however, that the percent of thrifts with significant interest rate sensitivity (NPV loss of 20 to 40 percent) has increased to 37.6 percent in June 1997 from 34.8 percent one year ago. This increase is largely offset by a decline in the percent of thrifts with very high interest rate sensitivity (over 40 percent NPV loss) from 5.9 percent one year ago to 3.3 percent in June 1997.

## INDUSTRY PROFILE

The pre- and post-shock NPV capital ratios of each reporting thrift are plotted in the NPV Sensitivity Chart (Chart 8, page 8). In this chart, the horizontal axis represents a thrift's pre-shock NPV ratio and the vertical axis represents its post-shock NPV ratio. The 45 degree line represents the "zero sensitivity line," where pre- and post-shock NPV ratios are equal. Each dot denotes the pre- and post-shock NPV capital ratios for a thrift. The nine thrifts with post-shock NPV ratios of less than 4 percent appear in the area below the dotted horizontal line. A thrift whose post-shock NPV ratio is below the 4 percent line either has a relatively low level of capital, a high degree of NPV sensitivity, or both. Thrifts with exposure ratios below 4 percent should strengthen their capital position or reduce their interest rate sensitivity.

As Chart 7 (page 8) shows, the number of thrifts with exposure measures below 4 percent decreased dramatically in the second quarter to nine (0.8 percent of all reporting thrifts), substantially below the recent peak level of 142 in December 1994. This historically low number of thrifts with exposure ratios below 4 percent is consistent with both the historically high equity capital ratios in the industry and the percent of individual thrifts that are "well capitalized."

## THRIFT SIZE AND INTEREST RATE RISK

Table 2 (page 10) reports the pre-shock and post-shock NPV ratios and the sensitivity measure for three different thrift-size categories for June 1996 and June 1997. Not surprisingly, the pre-shock and

exposure (post-shock) capital ratios vary inversely with thrift size in both quarters. That is, as thrift size increases, both ratios fall. It is well-known that smaller thrifts have larger capital ratios than bigger thrifts.

The relation between thrift size and the sensitivity measure, however, displays a different pattern. An upside down U-shape characterizes the relation between thrift size and sensitivity. This result at first glance seems counterintuitive, since bigger thrifts are expected to have lower interest rate sensitivity due to their greater use of financial derivatives for hedging purposes. This suggests an inverse relation between thrift size and sensitivity. Differences in the percentages of fixed- and adjustable-rate mortgages (ARMs) held by small and medium sized thrifts accounts for the U-shape pattern. Thrifts with assets below \$500 million hold fewer COFI ARMs and more 15-year fixed-rate mortgages in their portfolios than thrifts with assets between \$500 million and \$1 billion. Holding the number of adjustable- and fixed-rate mortgages in a thrift's loan portfolio constant, sensitivity rises as the number of COFI ARMs increases, but falls as the number of 15-year fixed rate mortgages increases. Consequently, interest rate sensitivity for small thrifts is lower than for medium sized thrifts. The greater use of derivatives for hedging interest rate risk accounts for the lower sensitivity of the large thrifts, those with assets over \$1 billion.

Table 2 also shows that all three asset size groups increased their post-shock NPV ratios over the last year even though only thrifts with assets between \$500 million and \$1 billion sustained a reduction in interest rate sensitivity. Thrifts with assets greater than \$1 billion had their median sensitivity

increased 7.7 percent over the past year to 197 basis points. The increase in interest rate sensitivity was greatest for large thrifts.

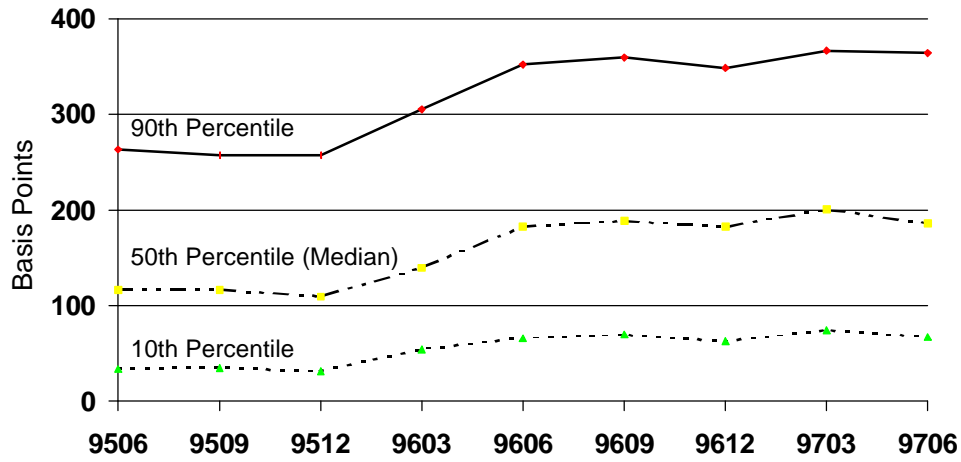
### **REGIONAL PROFILE**

The top panel of Chart 9 (page 9) presents the median sensitivity measures for the entire industry and each OTS region for the second quarter of 1996 and 1997. As shown in the chart, the Northeast Region had the largest median sensitivity measure in the second quarter of 1997, while the Midwest Region had the smallest. In comparing the second quarter of 1996 and 1997, the Northeast Region experienced the largest increase in median interest rate sensitivity. Over the same period, the Midwest Region had the smallest increase in the median sensitivity measure, while the West Region experienced a modest decline in median sensitivity.

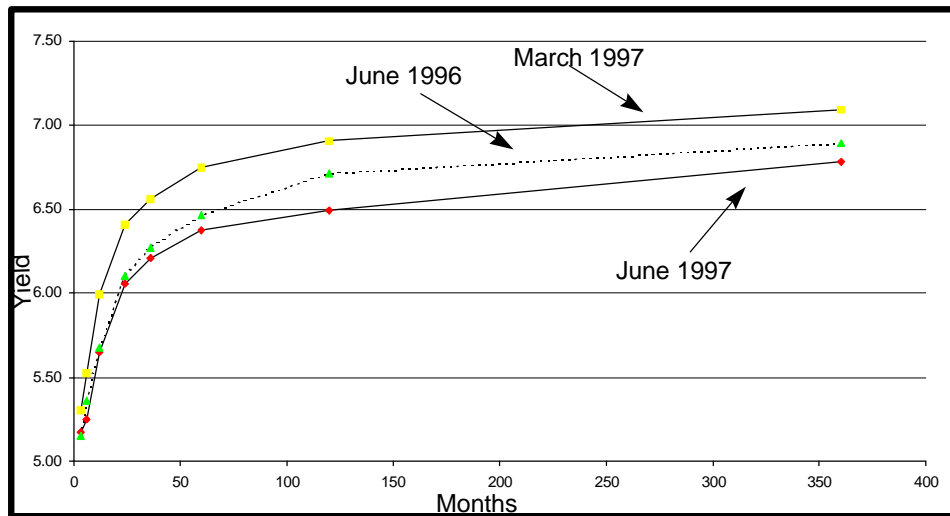
The lower panel of Chart 9 shows the median post-shock NPV ratio (exposure ratio) for the thrift industry and each OTS region. The increase in post-shock NPV ratios between the second quarter of 1996 and 1997 for the entire industry and each region, except the Northeast, suggests the decrease in interest rate risk exposure was widespread. In the Northeast Region, the post-shock NPV ratio fell from 10.1 percent to 9.8 percent, indicating an increase in exposure to interest rate risk. In the second quarter of 1997, the Central Region had the highest post-shock NPV ratio, while the West Region had the lowest post-shock NPV ratio.

Anthony Cornyn, CFA  
Jonathan Jones, Ph.D.

**Chart 1  
Sensitivity Measure**

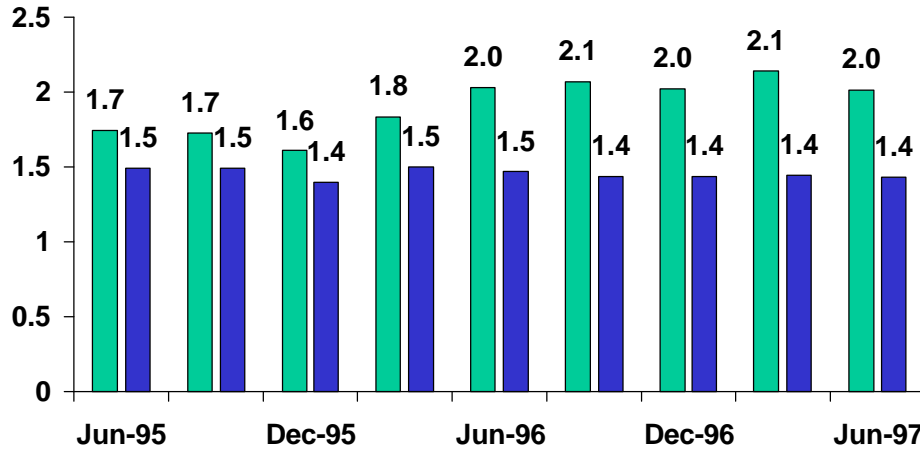


**Chart 2  
Treasury Yield Curves**



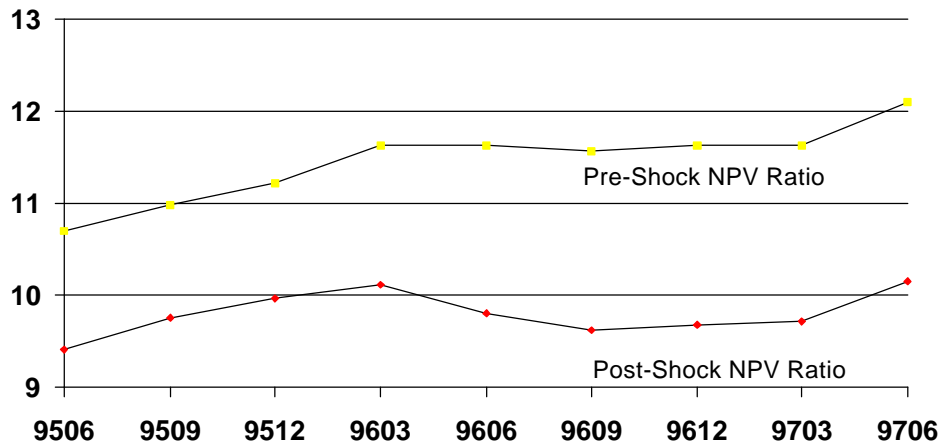
Source: Bloomberg

**Chart 3**  
**Duration of Assets and Liabilities**

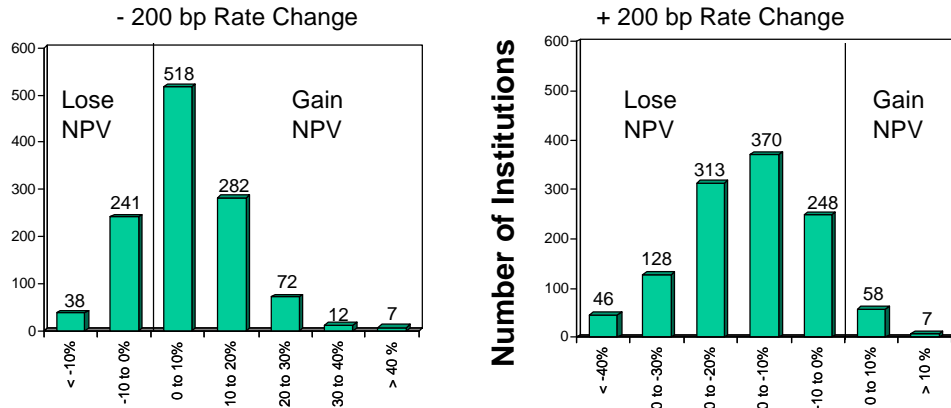


Note: Aggregate industry data. Asset durations have been adjusted to exclude deposit intangibles; liability durations have been adjusted to include deposit intangibles.

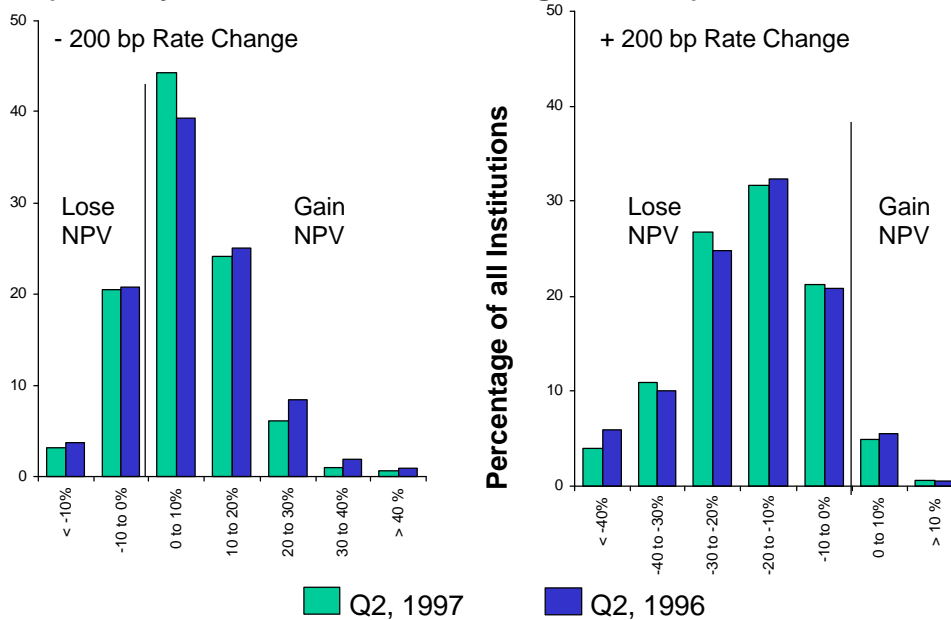
**Chart 4**  
**Median Pre-Shock and Post-Shock NPV Ratios**



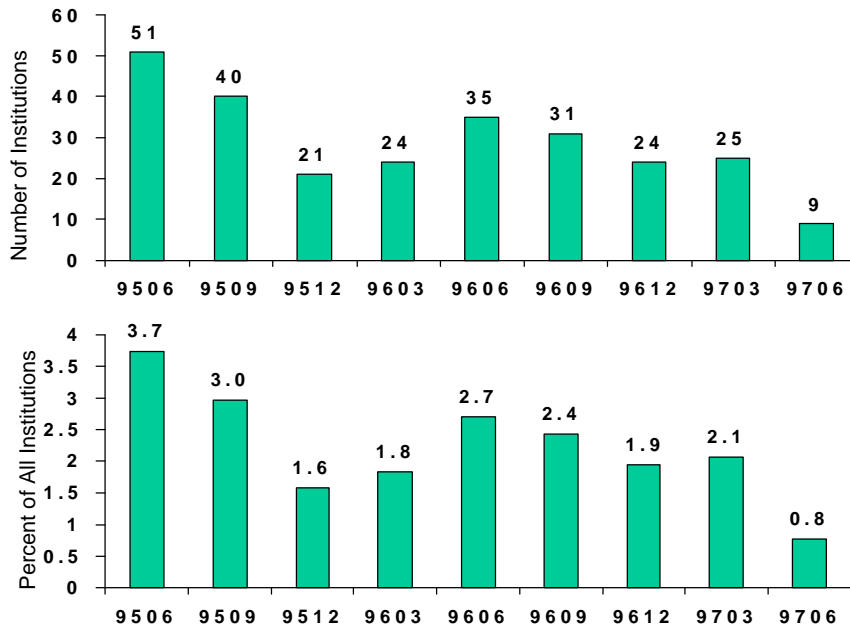
**Chart 5**  
**Estimated Change in NPV**  
**(Industry Distributions, SecondQuarter 1997)**



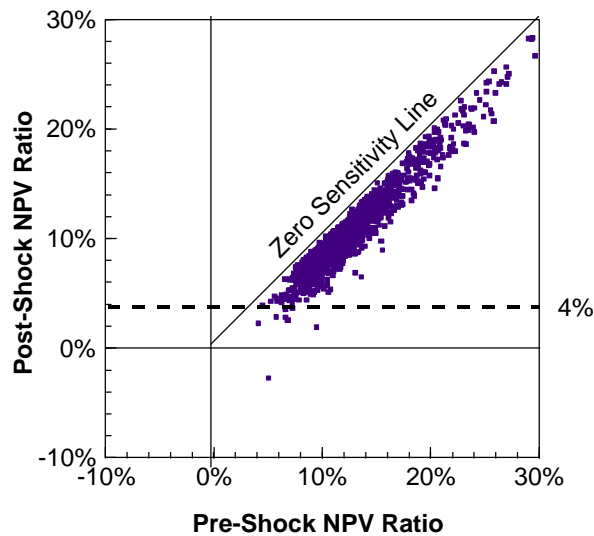
**Chart 6**  
**Estimated Change in NPV**  
**(Industry Distributions - Percentage of Total)**



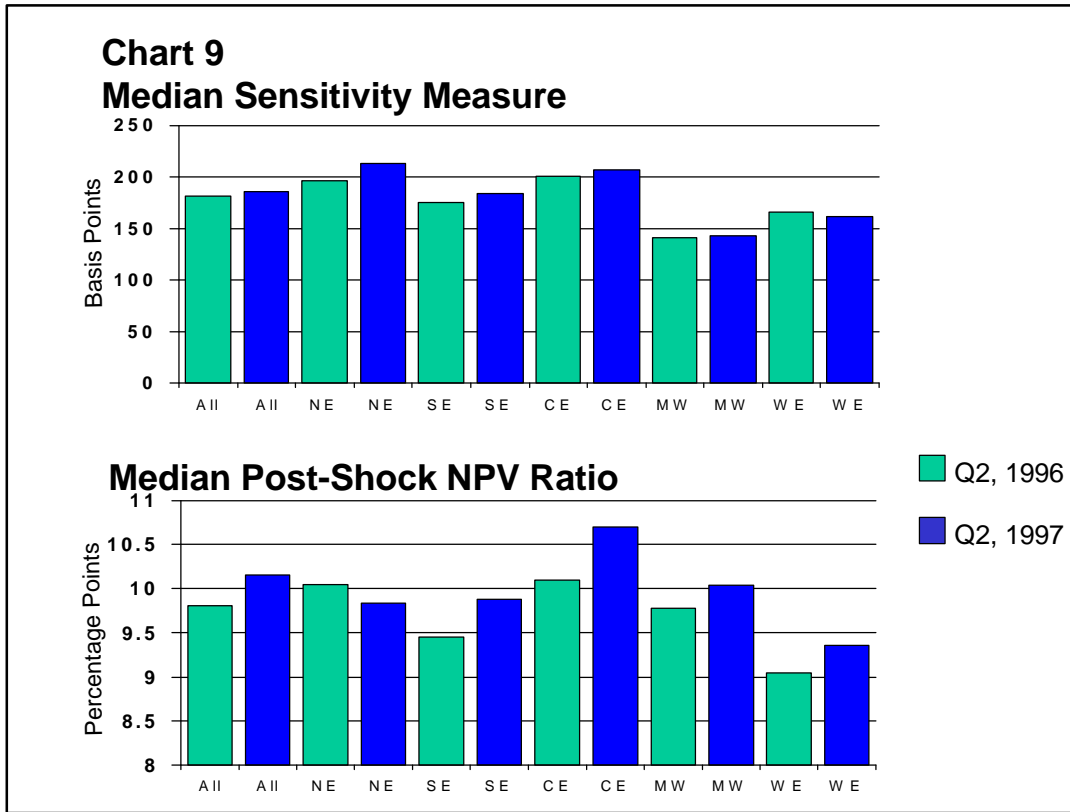
**Chart 7**  
**Institutions with Exposure Ratios Under 4.0 Percent**



**Chart 8**  
**Sensitivity Chart**  
**(Second Quarter, 1997)**







**Table 1**  
**Interest Rate Risk Measures**  
**(Industry Aggregate Data)**

Change in Interest Rates (basis Points)	Percentage Change in NPV			Ratio of NPV to Assets		
	Jun-96	Mar-97	Jun-97	Jun-96	Mar-97	Jun-97
	+300	-33.3	-36.3	-33.3	7.0	6.8
+200	-20.1	-22.3	-20.1	8.2	8.1	8.5
+100	-8.7	-10.0	-8.8	9.2	9.2	9.5
Base Case	0.0	0.0	0.0	10.0	10.1	10.3
-100	5.3	6.4	4.9	10.4	10.6	10.7
-200	7.2	8.6	6.3	10.5	10.7	10.7
-300	9.3	9.9	8.0	10.6	10.8	10.8

**Table 2**  
**Thrift Size and Interest Rate Risk Measures**  
**(Industry Medians)**

Base Case	Number of Institutions	NPV Ratios		Sensitivity Measure
		Pre-Shock	Post Shock	
<b>June 1996</b>				
Under \$500 Million	1078	11.93 %	10.15 %	178
\$500 to \$1 Billion	99	10.96 %	8.77 %	232
Over \$1 Billion	113	9.22 %	7.3 %	183
<b>June 1997</b>				
Under \$500 Million	971	12.5 %	10.61 %	183
\$500 to \$1 Billion	90	11.36 %	9.5 %	213
Over \$1 Billion	111	9.64 %	7.92 %	197

**GLOSSARY**

<b>Pre-Shock NPV Ratio</b>	Equity-to-assets expressed in present value terms (i.e., base case NPV divided by present value of assets).
<b>Post-Shock NPV Ratio</b>	Equity-to-assets ratio expressed in present value terms following an adverse 200 basis point interest rate shock. Also referred to as the exposure ratio.
<b>Sensitivity Measure</b>	Difference between pre-shock and post-shock NPV Ratios (expressed in basis points).
<b>Estimated Change in NPV</b>	The percentage change in base case NPV caused by an interest rate shock.

*This publication is available from the OTS PubliFax by calling (202) 906-5660 and requesting document 11720. Additional interest rate risk publications from the Risk Management Division may be obtained from:*

*\* The OTS web site at <http://www.ots.treas.gov/quarter.html>*

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**End Notes:**

<sup>1</sup> Duration is a measure of the price sensitivity of a financial instrument for small changes in yield. The higher the duration of an instrument, the greater is its price sensitivity. For example, an asset with a duration of 1.6 will appreciate in value by about 1.6 percent for a one percentage point (100 basis points) decline in yield. The reverse would hold if yields rose by one percent.